

## Electro-Chemical Decomposition 55

211. Water, therefore; is in this respect merely one of a very numerous class of substances,, instead of being the *only one* and *essential*; and it is of that class one of the *worst* as to its capability of facilitating conduction and suffering decomposition.

The reasons why it obtained for a time an exclusive character which it so little deserved are evident, and consist, in the general necessity of a fluid condition (i30)r; in its being the *only one* of this class of bodies existing in the fluid state at common temperatures; its abundant supply as the great natural solvent; and its constant use in that character in philosophical investigations, because of its having a smaller interfering, injurious or complicating action upon the bodies, either dissolved or evolved, than any other substance.

212. The analogy of the decomposing or experimental cell to the other cells of the voltaic battery, renders it nearly certain that any of those substances which are decomposable when fluid, as described in my last paper (138), would, if they could

be introduced between the metallic plates of the pile, be equally effectual with water, if not more so. Sir

Humphry Davy found that litharge and chlorate of potassa were thus effectual.<sup>1</sup> I

have constructed various voltaic arrangements, and found the above conclusion to hold good. When any of the following substances in a fused state were interposed between copper and platina, voltaic action more or less powerful was produced.

Nitre; chlorate of potassa; carbonate of potassa; sulphate of soda; chloride of lead, of sodium, of bismuth, of calcium; iodide of lead; oxide of bismuth; oxide of lead: the electric current was in the same direction as if acids had acted upon

the metals. When any of the same substances, or phosphate of soda, were made to act on platina and iron, still more powerful voltaic combinations of the same kind were produced.

When either nitrate of silver or chloride of silver was the fluid substance interposed, there was voltaic action, but the electric current was in the reverse direction.

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Decomposition*

213. The extreme beauty and value of electro-chemical

compositions have given to that power which the voltaic pile possesses of causing their occurrence an interest surpassing that of any other of its properties; for the power is not only intimately connected with the continuance, if not with the

*Philosophical Transactions, 1826, p. 406.*

